Second, technical developments in local exchange networks in terms of (a) the deployment of new signaling systems, (b) the related development of intelligent network architectures or software driven network elements, and (c) further developments in multimedia applications are resulting in the need for different and generally more complex forms of network interconnection. Because of the increased complexity of the required forms of interconnection, incumbent local exchange carriers, including SWBT, have an increased ability to discriminate and to raise unfounded claims of technical harm and technical infeasibility in the provision of advanced forms of interconnection to long-distance (and local) carriers.

Third, because of the first two conclusions, the incumbent local exchange carriers, including SWBT, have the power to thwart or delay the development of advanced competitive long-distance services that are increasingly critical to interexchange carriers in differentiating their services in an intensely competitive market. These advanced forms of interconnection go far beyond the basic forms of interconnection required to achieve equal access following divestiture. Therefore, past experience with the interconnection of traditional voice and data networks will be less useful as a regulatory tool for preventing, detecting, and remedying discrimination in the future.

II. Prospects for Local Exchange Competition

Over the past twenty-five years or so, competition has been successfully introduced into the customer premises equipment and long-distance portions of the telecommunications market. I attribute this success to three principal factors: (1) the striking down of legal prohibitions on competition in these two segments of the telecommunications market, (2) the lack of significant economies of scale or natural monopoly characteristics in either of the two segments, and (3) the divestiture of the Bell Operating Companies (BOCs) from AT&T and the accompanying line-of-business restrictions that reduced the incentives of the divested BOCs to use their market power to discriminate against participants in the two competitive segments.

A combination of factors has held back competition in the local telephone segment of the telecommunications market including: (1) legal barriers to entry at the state level, (2) the massive size of the initial investments required to duplicate the existing local exchange network infrastructure, (3) difficulties in gaining the necessary interconnection arrangements with the incumbent local exchange carriers and in obtaining needed rights-of-way, (4) unnecessary bundling and resale restrictions imposed by the incumbent local carriers, and (5), more generally, difficulties in overcoming the natural monopoly characteristics of local telecommunications networks. Thus, despite local telephone company predictions to the contrary, the degree of local competition has remained *de minimus.*

In passing the Telecommunications Act of 1996, Congress took critical steps to facilitate the development of competition in the provision of local telecommunications facilities and services. It did so by affirming the policy of relying upon competition in telecommunications generally and, more specifically, by legislating against statutory and regulatory barriers to entry, by establishing the legislative groundwork for economical and non-discriminatory interconnection arrangements, and, among other things, by prohibiting unnecessary and unfair bundling and resale restrictions. Recently, in CC Docket No. 96-98, the Federal Communications Commission (FCC) took important first steps to achieve the pro-competitive goals of the 1996 Act.[2] Despite these critical steps by the Congress and the FCC, I continue to have strong reservations about whether robust competition in the provision of local telecommunications services will actually develop.

My reservations stem from two factors. First, I am concerned that, unlike the situation in the long distance and equipment manufacturing sectors of the market following divestiture, the BOCs, including SWBT, have a strong incentive to impede competition in their core market -- the provision of local exchange and exchange access services. Indeed, given the trivial amount of local competition that exists today, they not only have the incentive, but they also have the power to impede competition. Second, while striking down statutory and regulatory restrictions and eliminating or reducing other barriers to entry are <u>necessary</u>, they may not be <u>sufficient</u> to ensure the development of robust local competition. They may not be sufficient because of the enormous cost of creating multiple local telecommunications networks and the high risks associated with gaining sufficient market penetration to achieve reasonable economies of scale.

Over the past several years, our consulting firm, Hatfield Associates, Inc., has undertaken extensive studies that address the economic feasibility of local competition developing from three alternative sources: cable television, wireless local loop, and competitive access providers.[3] The original study, entitled the *Enduring Local Bottleneck* (ELB-I), was completed before the passage of the '96 Telecommunications Act. In January 1996, HAI provided a qualitative

---

[2] Local exchange carriers and some states have successfully petitioned the Courts for a stay of critical portions of the FCC's order in CC Docket No. 96-98. This has created additional regulatory uncertainty for potential entrants in the local exchange market.

[3] Economics and Technology, Inc./Hatfield Associates, Inc., <u>The Enduring Local Bottleneck: Monopoly Power and the Local Exchange Carriers</u>, 1994.

assessment of the technological and marketplace changes since the publication of the original. More recently, in a report entitled the *Enduring Local Bottleneck II* (ELB-II), we updated the cable telephone and wireless local loop quantitative analysis contained in the original report. As with ELB-I, the economic modeling suggests that firms using alternative technologies can compete with incumbent local exchange carriers such as SWBT. The updated analysis continues to show that, even under best case scenarios, such entry by cable and wireless companies is not very profitable and, because of the large investments required, there is a long delay before positive cash flow is achieved. Under these conditions, investors will be reluctant to commit large amounts of capital and, indeed, the capital resources necessary for widespread deployment of these alternative technologies may not appear.

Our analysis goes a long way in explaining, on a quantitative basis, why (1) the cable industry has apparently pulled back from full-scale telephony deployment and is focused more on providing Internet access services and on expanding and protecting their core business of delivering entertainment video programming, (2) the emerging wireless Personal Communications Service providers appear to be focused almost entirely upon competing with existing cellular mobile radio carriers rather than providing ordinary local telephone services, and (3) the competitive access providers (CAPs) still seem focused primarily on providing switched and dedicated transport services to business customers in limited -- typically downtown -- areas.[4] While the latter group, the CAPs, are leasing local loop and other unbundled facilities from the

[4] AT&T recently announced a new wireless local loop technology that may turn out to be more promising than earlier developments. However, little technical or cost information on the technology has been released and hence there is no reliable way of forecasting whether or when the technology might be deployed on a widespread basis.

incumbent local exchange carriers (ILECs) in order to extend their geographic coverage, the amount of full facilities-based competition they provide is limited. In general, it is important not to confuse glowing press releases on limited market tests and premature technology "hype" with firm commitments and enduring actions by organizations with the substantial financial and technical resources to actually construct alternative networks on a ubiquitous and timely basis.

III. Technological Changes in the Local Exchange Network

As I noted in the previous section, the prospects for robust local competition are bleak in the short term and highly uncertain in the long term. This means that the BOCs, like SWBT, currently have strong strategic control over how customers reach independent networks and how providers of independent networks reach their customers. As long as BOCs, like SWBT, have monopoly power in the local exchange market, they have the power to technically discriminate in favor of their own competitive long-distance operations. They also have the power to refuse to offer (or to delay the provision of) technically feasible forms of interconnection and unbundled network elements to competitors wishing to offer differentiated services. Moreover, certain developments in local exchange networks have increased the risk of technical discrimination since divestiture. The three most significant developments in this regard are (1) the deployment of new signaling systems, (2) the development of "intelligent" or software driven networks and (3) further developments in multimedia applications (i.e., applications that involve combinations of voice, data, image, and video traffic). These developments are described in the paragraphs which follow.

A. New Signaling Systems

Besides conveying the customer's actual telephone message or conversation, a telephone network must also convey other information associated with setting up, disconnecting, and otherwise controlling the call itself. The transmission and reception of such control information between the customers and the network or between elements (e.g., switches) within the network is called signaling. Signaling is necessary for the establishment and control of connections through the network or collection of networks. An example of signaling information would be the address of the called party or an indication that the called party has "gone off-hook" or answered the call. Such control information is needed, for example, to route the call and to properly bill for it.

Until fairly recently, signaling in the telephone network was carried within the same channel or path that carried the telephone conversation or message. This was done by sending audible (Multifrequency or "MF") tones and the technique, accordingly, was called "in-band" signaling. The more modern arrangement, which is now used extensively throughout both LEC and IXC networks, is called common channel signaling. With common channel signaling, signaling information is exchanged via a data network (actually a specialized packet-switched network) that is separate from the conversation path. In-band signaling has significant limitations compared to modern common channel switching signaling systems. According to a Director at Bellcore, these limitations include the fact that:

> . . . signaling can only occur before or after the user communications takes place; all signaling is associated with calls - no signaling can be done without setting up a call path; the signaling path must follow the call path; the signaling vocabulary

> is small; and only limited signaling information can be sent to minimize call set-up delay.[5]

The same source goes on to say that "With these limitations, in-band signaling only supports basic call set-up and a limited set of services."[6] A common channel signaling ("CCS") system such as Signaling System 7 ("SS7") protocol overcomes these limitations and becomes a crucial component of not only ordinary calling, but also of current and future network-based services. Or, as summarized in the same reference:

> CCS/SS7 not only provides faster call set-up but also can be used to support a variety of services. These services include CLASS℠, Calling Name Delivery and ISDN services. CCS and SS7 also support Advanced Intelligent Network (AIN) and Personal Communications Services (PCS).[7]

Current SS7-based offerings include Calling Card, 800-Number, and CLASS℠ services.[8] The latter include automatic callback, automatic recall, calling number/name identification, selective call acceptance/rejection, distinctive ringing, customer originated call time and several others.[9]

Another expert notes that:

> SS7 is really a *control* network, as well as a signaling network. This is important to understand, because as the Information Highway rolls out, and as the Advanced Intelligent Network (AIN) is implemented, SS7 will be relied upon almost

---

[5] Merrell, Ann E., "CCS/SS7 - A Services Perspective," Annual Review of Communications (National Engineering Consortium, Chicago, IL, 1992), p. 599.

[6] Id.

[7] Id.

[8] CLASS was originally an acronym for the term Custom Local Area Signaling Services. It is now used as a servicemark for a collection of telephone company provided services.

[9] Bellcore, BOC Notes on the LEC Networks, Special Report SR TSV-002275, Issue 2, April, 1994, pp. 14-13 thru. 14-19.

exclusively as a means for telephone companies and other service providers to share database information and switching control without human intervention.[10]

Thus, while the development and deployment of this advanced common channel signaling system is important in its own right because of increased efficiencies in setting up, disconnecting, and otherwise controlling telephone calls, it is also critical to the development and deployment of AIN. As the author quoted immediately above notes, "Without SS7, AIN is not possible."[11]

SS7's expanded vocabulary, its ability to exchange signaling information independent of a call, its ability to exchange signaling information during the call, its increased speed, and its other advanced characteristics all lead to the conclusion that the interconnection of SS7-based networks is more complex than the interconnection of networks using traditional in-band signaling techniques. This complexity is heightened by the expanded role that SS7 plays as a control network and central nervous system of the modern telephone network.[12]

---

[10] Russell, Travis, Signaling System #7, McGraw-Hill Series of Computer Communications, McGraw-Hill, New York, 1995, p. xvi.

[11] Id.

[12] In the past, the BOCs and other incumbent LECs have been able to agree on the technical arrangements for interconnecting their networks. However, it took time and it ultimately succeeded because the interexchange carriers were primarily customers, not competitors, and, hence, the BOCs had no countervailing incentives to discriminate. That would change if the BOC were authorized to compete in the interexchange business.

B. Advanced Intelligent Network[13]

In the traditional telephone network, all of the instructions or service logic on how to process or route a call were contained within the local switching platform itself. This meant that, if the local exchange carrier wanted to introduce a new service, it had to wait for the manufacturers to develop the required software, and then it had to install the new software in each of its local (end office) switches. In the Advanced Intelligent Network concept, on the other hand, data bases and computer platforms called Service Control Points (SCPs) are added to the network and located at a central point outside of the existing central office switches. This allows the local exchange carrier to develop new and customized services more quickly, at lower cost, and independent of the provider of the local switching equipment. These local exchange switches, referred to as Service Switching Points (SSPs) in the AIN concept, are equipped to recognize certain triggering events such as when a subscriber dials a particular sequence of numbers, e.g., 1-800 or 1-888. When the trigger is activated, the switch (SSP) then sends a message containing information about the call over the SS7 network to the remote SCP asking for instructions on how it is to be routed.[14] The SCP then sends the routing instructions back to the SSP.

---

[13] The generic term for the developments described in this section is intelligent networks. In the United States, the most prevalent deployment scenario is provided by Bellcore's Advanced Intelligent Network -- AIN -- architecture.

[14] The logic and information necessary to route a call when a trigger is encountered does not have to reside at a remote location. It may be contained in a computer that is attached to the local switch or SSP. This device is called an Intelligent Peripheral or adjunct. Separating the service logic from the switch in this manner has significant advantages. Conceptually, the AIN architecture allows the "intelligence" to be distributed throughout the network in an optimal way -- locally (e.g., in the IP or adjunct) as well as regionally or nationally (in an SCP).

The SCP can be used to have the call routed differently depending upon the calling or called number, the geographic location of the called party, the time-of-day, additional information requested from and provided by the person placing the call (e.g., by the network furnishing voice prompts asking the user to enter additional digits such as a Personal Identification Number -- PIN), information provided by the called party, the status of the called line, or conditions in the network. For example, all calls to a single telephone number assigned to a particular pizza restaurant chain can be routed to the nearest outlet of the chain. This can be accomplished by logic residing in the SCP utilizing the telephone number of the caller (i.e., the calling number) and information on restaurant locations stored in a data base accessible by the SCP.

Note that the Intelligent Network concept means that, in essence, the local exchange network is becoming increasingly programmable or software driven. As I suggested above, this allows the carrier to develop new and customized services more quickly and efficiently. Indeed, the AIN vision has been characterized as representing "a true software-only architecture in the public network, separating call transport from control"[15] and ". . . clearly the future of the public network."[16] Viewed in this way, the service logic is analogous to the application software residing in a computer (e.g., a word processing or spreadsheet program) and the basic call processing functionality is roughly analogous to an operating system (e.g., UNIX or DOS). Clearly, the interconnection of networks in the Advanced Intelligent Network environment, with

[15] Fried, Jeff, "Extending CTI's Reach," Telephony, (October 21, 1996), p. 46.

[16] Glowacz, Dave, "AIN Services Get New Life in 1993," Telephony, (January 11, 1993), p. 32.

the added interfaces, access to Service Logic and data bases at remote locations, and software-based programmability, is more complex than the interconnection of traditional telephone networks.

C. Multimedia Services

With the further deployment of digital transport facilities, advanced forms of switching such as Asynchronous Transfer Mode (ATM),[17] multimedia information sources (servers) and multimedia-capable terminal equipment (clients), the service offerings of carriers will increasingly involve the intermixture of voice, data, image, and video traffic in a single call or computer session. Clearly the interconnection of two networks carrying interactive, multimedia traffic is much more complex than past interconnection arrangements involving just voice or data separately. For example, in an ordinary circuit switched voice call, a fixed amount of capacity or bandwidth is allocated by each interconnected network for the duration of the call. Assuring adequate capacity in this environment revolves around ensuring that there are an adequate number of fixed capacity circuits to handle the offered traffic during the busy hour. On the other hand, with ATM switching and multiplexing, the exact amount of capacity or bandwidth is allocated on a moment-to-moment basis. While ATM is generally regarded as ideal for handling the very bursty and highly variable traffic associated with multimedia applications, assuring acceptable levels of service quality is inherently more difficult. With ATM, congestion control and bandwidth allocation mechanisms are much more complex because, not only does the

[17] ATM handles a mixture of traffic types (e.g., bursty or constant and delay sensitive or non-delay sensitive) by converting all of the information into a common format consisting of a sequence of fixed length cells. In other words, all of the traffic, regardless of type, is "chopped up" into short cells that are individually processed (switched).

number of "calls" or required connections vary, but the amount of capacity or bandwidth they require varies on a "real-time" basis as well. As I indicated, this significantly increases the complexity of the required interconnection arrangements between two networks.

IV. Risk of Successful Discrimination

Up to this point, two important points have been established in evaluating the power and the ability of SWBT to engage in anticompetitive, discriminatory activities against unaffiliated long-distance carriers if they are granted authority to enter the in-region, interLATA services market prematurely. *First*, based upon the analysis contained in Section II and the updated analysis contained in ELB-II, the incumbent Local Exchange Carriers will retain bottleneck control over the local exchange network for the foreseeable future. Therefore, they have the power to discriminate against not only unaffiliated long-distance carriers, but emerging local exchange carriers as well. *Second*, technical developments in local exchange networks in terms of (a) the deployment of new signaling systems, (b) the related development of AIN or software driven network elements, and (c) further developments in multimedia applications are resulting in the need for different and generally more complex forms of network interconnection.

In this section, I first explain how these conditions increase the risk that SWBT and other BOCs will frustrate long-distance competition by discriminating against unaffiliated long-distance carriers if they are permitted to enter that market. I will then explain how the example of Open Network Architecture confirms the existence of these dangers.

A. Discrimination Against Unaffiliated IXCs

As described above, one major benefit of the developments in the incumbent's local exchange network is that the increased intelligence allows the individual fine tuning or customization of services to meet specific customer requirements. But this very ability to customize means that they can "fine tune" their local exchange networks to favor (a) their own interexchange operations over their interexchange carrier competitors and/or (b) their own end user customers over the end user customers of their interexchange carrier competitors. Stated another way, the incumbent local exchange carriers, including SWBT, will have additional -- and generally more subtle -- methods of discrimination available to them.

The relationship between customization based upon network intelligence and the need for cooperation by the incumbent local exchange carrier can be illustrated by an example. Consider a scenario in which an important customer of SWBT in Oklahoma City desires a customized switched voice service. This could arise when, for example, a regional department store chain or regional financial services firm wants incoming calls to its stores or offices handled in a customized fashion based on such things as the location from which the call originates, the time of day, information entered by the caller when the call is placed, information previously stored in the network based on information supplied by the customer, and the state of the incoming lines at the various locations. With the development of the Advanced Intelligent Network as described above, SWBT and the other BOCs now have the capabilities (and are developing even more sophisticated capabilities) for providing such customized services.

Now assume that, besides operating stores or offices in the Oklahoma City area, this large regional customer of SWBT also operates stores or offices throughout Oklahoma and, hence, wants to include incoming calls in that area in the customized service they are seeking to procure. Further assume that this important customer decides to go through a competitive bidding process for acquiring the customized service.

One component of such a customized service might be the customer's need to have their own customers reach them by dialing a special local telephone number that is the same throughout the region in which it operates. That need might stem from the customer's desire to use a single number in their regional advertising campaigns and to avoid the high charges for 800 number calling for what would otherwise typically be a local call. Another component of the service might be that the customer wants calls to the common local number to be routed to its nearest office or store during normal business hours, but to a centralized 24-hour service desk in Oklahoma City after hours. With the traditional telephone network architecture, such service features would be difficult or impossible to provide.

Because of the importance of the customer, SWBT would surely seek to provide this customized service as would several long-distance carriers. To have the service work as described, however, the long-distance carriers would have to obtain the cooperation of SWBT because of its bottleneck control of the necessary local facilities.

The nature of the required cooperation can be gleaned from considering the proposed service in a little more detail. For example, say that the customized service involved the dialing of the prefix 203 when a subscriber was calling the large customer procuring the service. Dialing 203 would result in the local switch suspending the call briefly while a Service Control Point was being queried. Using the telephone number of the calling party and customer information stored in its data base, the Service Control Point would then send a message back to the local switch serving the subscriber placing the call. The message would contain the information necessary for the local switch to route the call to the office or store nearest to the subscriber's location, or if it were after hours, to the customer's 24-hour service desk in Oklahoma City. Thus, one basic aspect of the required cooperation is that the local switches in both Oklahoma City and, say, the Tulsa area would have to be equipped to recognize the prefix 203 as a trigger.[18]

This example illustrates how the BOCs, including SWBT, can use the much greater complexity of the local exchange network to discriminate against unaffiliated long-distance carriers in the provision of increasingly important differentiated service offerings. SWBT has more incentive to cooperate with itself than with an unaffiliated long-distance carrier such as MCI, or to state it another way, to discriminate against the unaffiliated carrier in negotiating and agreeing to make such changes in its local switches.

This expanded ability to discriminate includes a host of potential anticompetitive actions. For example, the BOCs can refuse to provide interconnection at critical points in their intelligent network based on alleged technical harm to the network. They can refuse to convey certain types of control messages across the AIN for the same reason or because of claims that standards for a particular message type do not exist. They can refuse to provide certain forms of interconnection unless the signaling messages pass through some type of "filter" that they control -- a filter (or mediation function as it is often referred to) that is not actually needed to ensure the integrity of the network. They can use this control over the filter to artificially restrict the message sets to those associated with the services they wish to offer or to degrade the performance of a competitor's service offerings. They can refuse to provide certain information collected from customers and stored in the network on the basis that the information is proprietary. They can

[18] The use of a particular number to be recognized as a trigger for the customized handling of calls is a relatively simple example. More complex examples might include a request to recognize an entirely different type of trigger or to install new call handling logic in the local switch or attached Intelligent Peripheral.

refuse to develop, deploy and execute certain types of service logic based on potential harm or developmental costs or priorities.

Rather than outright refusal, the BOCs, including SWBT, can resort to a "slow roll" of their competitors or potential competitors. They can initially respond to an interconnection-related request (e.g., for the conveyance of a particular type of control message over the local signaling channel or the deployment of particular service logic) on the basis that they don't understand it technically; they can refuse to provide or be slow in giving the requester essential technical information; they can assert that the request is not technically feasible or must involve time-consuming study; after agreeing that it is technically possible, they can delay by arguing that standards must be developed; they can argue that any required modifications to the network will take a long time and require extensive testing. If they finally offer the requested capability, they can charge unreasonable prices.

In addition, in requesting the modifications of the local switches necessary to respond to the large customer's request, the unaffiliated carrier would be forced to reveal technical information to its competitor, SWBT, on its intended technical solution. This alone puts the unaffiliated carrier at a significant disadvantage. SWBT could give its long-distance affiliate discriminatory access to this information, while protecting comparable information from its affiliate from unaffiliated competitors.

Because of the technical complexity of the SS7/AIN architecture, the critical role it plays as the nervous system of the network, and the necessarily more limited technical knowledge of outsiders, determining whether a particular refusal or delay is justified becomes an almost impossible task for competitors and regulators alike. Faced with claims that certain competitively critical forms of interconnection (or unbundling) are not technically feasible or, especially, that they would cause harm to the network, the regulator would, understandably, be reluctant or hesitant to require the requested form of interconnection or would continue in such a cautious fashion that it would seriously hinder or delay the unaffiliated carrier. The ability to refuse or delay such requests puts SWBT in the position of controlling the development of new and competitive services, both as to whether the new service is created at all or, more subtly, when it comes to market and who can provide it. Through these means, SWBT and the other BOCs can extend their monopoly power over physical facilities (e.g., the local loop) upward into the signaling network and software driven service logic and thereby discriminate against their interexchange competitors.[19]

In summary, the increased complexity of the interface between local and long-distance networks increases the risk of discrimination and makes it more difficult for regulators to prevent, detect, and remedy it. This is in contrast to the early days of interexchange competition when competitors were largely satisfied if they could obtain the basic forms of interconnection required to achieve equal access and to offer "plain vanilla" long-distance service. With intensified competition and changing customer requirements, however, long-distance carriers, by necessity, have increased their use of network-based intelligence for differentiating their services from those of the competitors. However, as explained above, the provision of these differentiated, software-based services depends upon the cooperation of the local exchange

[19] Using their control over lower level signaling and switching functions to favor their own software driven services is not unlike the allegations that Microsoft has used its control over personal computer operating systems to unfairly dominate the market for applications software.

carrier. The interexchange carriers are dependent upon incumbent local exchange carriers for certain critical information (e.g., the state of the called line) and for the conveyance of that information across the local carrier's bottleneck facilities. In short, just at the time the long-distance carriers need more cooperation from the BOCs such as SWBT, they face the prospect of them becoming competitors if authorization for in-region, interLATA service is granted prematurely. Because of the requirement for different and more complex forms of interconnection (e.g., that necessary to provide multimedia services), past experience with the interconnection of traditional voice and data networks will be less useful as a regulatory tool for preventing, detecting, and remedying discrimination.

B. The Example of ONA

Evidence of the ability of the incumbent local exchange carriers, including SWBT, to raise claims of technical harm and technical infeasibility in the provision of advanced forms of interconnection and thereby discriminate and thwart or delay the development of advanced competitive services is contained in the history of Open Network Architecture before the FCC. In Computer Inquiry III, which was launched in 1985, the Commission determined that the BOCs should be allowed to provide unregulated enhanced services jointly with their regulated basic local exchange services if they met certain conditions. In other words, they were relieved of the long-standing requirement to offer such unregulated services through a separate, arms-length subsidiary subject to a set of conditions.

One of the most important of these conditions was a requirement that the BOCs unbundle their local exchange networks and offer the resulting Basic Service Elements (BSEs) to all enhanced service providers (including their own internal enhanced service operations) on a tariffed basis and under the same terms and conditions. The notion was that both the BOCs and the unaffiliated providers would then use these basic building blocks to construct their own competitive enhanced service offerings. This concept of unbundled BSEs that the Commission tried to implement in the ONA proceeding is similar to the requirement for unbundled network elements in the '96 Telecommunications Act.

This idea of unbundling and allowing all enhanced service providers to have access to the basic building blocks of the local telephone network was called Open Network Architecture (ONA). With ONA, it appeared that the FCC had ordered the ultimate unbundling of the local exchange network into its component parts. However, the ONA Plans submitted to the Commission by the BOCs to meet the ONA requirements were based upon "Model ONA Plan" developed by Bellcore (which was owned by the BOCs). The model destroyed the very essence of the ONA concept as originally envisioned by the Commission. It also failed as a true open architecture as that term is understood in the computer and telecommunications industries. It did so by introducing the concept of a Basic Serving Arrangement, or BSA, which essentially maintained the status quo by defining the fundamental building blocks to be equivalent to the degree of bundling in the existing local exchange network. What they ended up offering as BSEs amounted to little more than enhancements to the customer calling features (such as call forwarding or call waiting) that were already available on modern local Central Office switches.[20] Thus, by using the Common ONA Model and raising claims of technical harm and technical infeasibility, the BOCs were able to prevent the adoption of a truly unbundled, open architecture

[20] For a more complete discussion of these issues see "Open Network Architecture: A Promise Not Realized," Hatfield Associates, Inc., Boulder, CO (April, 1988).

as originally envisioned by the Commission. Moreover, the BOCs priced the BSAs (which enhanced service providers were required to acquire as a condition of obtaining the limited set of BSEs) so high that they have proven largely unattractive to enhanced service providers. Instead, enhanced service providers have continued to buy ordinary business lines in order to offer services to their own customers. These tactics, coupled with refusals to provide for the collocation of enhanced service provider equipment in their local Central Offices, effectively killed the Commission's initial attempts at unbundling.

Although the Commission, in the face of stiff BOC opposition, refused to order what it referred to as fundamental unbundling, it recognized that further unbundling might be in the public interest. Consequently, the Commission ordered the BOCs to study further unbundling through the Information Industry Liaison Committee (IILC) within the Exchange Carriers Standards Association (ECSA).[21] As a result of the FCC's order, the IILC eventually established a Task Group to address issues relating to network unbundling. Participants in the Task Group's efforts included both BOC and non-BOC representatives. The Task Group eventually developed a diagram and other documentation that displayed potential opportunities for more fully unbundling the local exchange network. The Task Group had no authority to impose its recommendations on the parent committee, the IILC, and all of its materials contained the caveat "Subject to Final Review and Approval by the IILC." It should be no surprise that the IILC was unable to reach a consensus on the unbundling issue, and the report was replete with statements

[21] Filing and Review of Open Network Architecture Plans, CC Docket No. 88-2, Phase 1, Memorandum Opinion and Order, 4 FCC Rcd 1, at 42, para. 70 (1988) (BOC ONA Order). The ECSA was subsequently renamed the Alliance for Telecommunications Industry Solutions (ATIS).

that unbundling at a particular interface would create a host of policy, regulatory, and business issues that would require further resolution. Note that the IILC process alone took several years to complete and still resulted in serious disagreements between the BOCs and Enhanced Service Providers (ESPs) over the degree of unbundling that was technically feasible.

Two other developments during the IILC's deliberations on the unbundling issue are worth noting. First, in late 1991, the Commission launched a Notice of Inquiry to explore the public policy issues relating to the implementation of intelligent network architectures by local telephone companies.[22] The Commission's stated goal in the proceeding was "to encourage development of local exchange networks that are as open, responsive, and procompetitive as possible, consistent with our other public interest goals, such as ensuring network reliability and integrity and avoiding the imposition of uneconomic costs."[23] It should be emphasized that, in launching the Notice of Inquiry, the Commission's primary focus was on giving third parties more open access to the intelligent network architectures being implemented by the BOCs rather than on unbundling local loops, switching, and transport.

As characterized by the Commission in the subsequent rulemaking proceeding,[24] parties other than the LECs responded by urging the Commission to intervene to ensure that the LECs do not frustrate competition by developing the intelligent network in a closed, proprietary

---

[22] In the Matter of Intelligent Networks, CC Docket No. 91-346, Notice of Inquiry, 6 FCC Rcd 7256 (1991) (Notice of Inquiry).

[23] Notice of Inquiry, 6 FCC Rcd at 7256, para. 1.

[24] In the Matter of Intelligent Networks, CC Docket No. 91-346, Notice of Proposed Rulemaking, 8 FCC Rcd 6813 (1993) (Notice of Proposed Rulemaking).

manner that would foreclose open access. The Commission also noted that these parties argued that the intelligent network would be unlikely to develop properly in response to market forces because of (a) the LECs' bottleneck control over the interface between the intelligent applications and the network, (b) the LECs' control over further intelligent network technical developments and implementation, and (c) the LECs' historical resistance to opening their networks to applications by third parties.[25] According to the Commission, the LECs, on the other hand, strenuously argued that market forces were sufficient to ensure procompetitive development of the intelligent network. The Commission went on to note that "They [LECs] argue that regulatory action is unnecessary and potentially harmful as it could cause market distortions and network inefficiencies, even potentially compromising network reliability."[26]

In the face of the claims by the LECs/BOCs, especially those relating to network reliability, it is understandable that the Commission took a very cautious approach. It suggested rules and in those rules proposed that third parties only be given mediated access to the intelligent network through the Service Management System[27] rather than at the SCP or the local switch (SSP). It also suggested that it would adopt a serial approach in which mediated access might eventually be extended to the SCP and local switch, but only after careful examination of the benefits and risks at each step. At the time that the Telecommunications Act of 1996 became

---

[25] Notice of Proposed Rulemaking, 8 FCC Rcd at 6815, para. 14.

[26] Notice of Proposed Rulemaking, 8 FCC Rcd at 6815, para. 15. (Footnote omitted. The omitted footnote specifically refers to, among others, SWBT Comments and Reply Comments in the proceeding.)

[27] Service Management Systems are associated with the administration and maintenance of the SCPs in the AIN.

law in February of 1996, the Commission had not issued an order actually requiring mediated access through the SMS and, as indicated above, the IILC was unable to agree on other forms of fundamental unbundling. Thus, almost exactly a decade passed between the time that the FCC set forth its vision of an unbundled, open local exchange architecture and the signing into law of the '96 Telecommunications Act in February of 1996, and no significant progress occurred during that time.

Not only was there a decade-long delay, it is likely that the unbundling requirements incorporated in the '96 Telecommunications Act resulted from a change in the BOCs' perception of their own strategic interests rather than from any fundamental technical development. Their acquiescence to the unbundling requirements was surely predicated upon obtaining relief from the line-of-business restrictions imposed by the Modification of Final Judgment. In other words, the movement toward a more unbundled, local network was due in a large part to the presence of other policy/regulatory incentives rather than a sudden change of heart regarding the desirability of providing access on such a basis. In short, the BOCs can speed up the provision of advanced forms of interconnection when it suits their strategic interests, and slow down or thwart them when they do not.

I want to make it clear that, in tracing this history of unbundling and ONA, I am not necessarily being critical of the Commission's past efforts to promote a more open architecture both in the original ONA and subsequent IN proceedings, nor in the steps it is taking in its interconnection proceeding to carry out portions of the '96 Telecommunications Act. Rather, I am using it as an example of how the BOCs, including SWBT, can use claims of technical harm and technical infeasibility in the provision of advanced forms of interconnection to thwart or delay the development of competitive services by unaffiliated long-distance carriers and other providers.

V. Response to the Affidavit of William C. Deere

Daniel C. Deere submitted an affidavit with SWBT's application to provide in-region, interLATA services originating in Oklahoma.[28] The Deere Affidavit concludes that:

> . . . from a technical perspective, SWBT cannot reasonably engage in a concerted plan to discriminate in favor of itself or its affiliate, or against other service providers. Furthermore, if SWBT did attempt to engage in such discrimination, that discrimination would be easily detected.[29]

Because the Deere Affidavit deals with issues similar to the ones dealt with herein and because it reaches opposite conclusions to my own, I will address his analysis and conclusions in this section.

The essence of Mr. Deere's conclusion is that discrimination in the quality of services and network elements is impractical or infeasible. According to Mr. Deere, it is infeasible because such discrimination would involve modification or replacement of a substantial portion of the generic software that drives SWBT's switches and systems and it would require the involvement of non-affiliated switching equipment vendors and the cooperation of "hundreds of SWBT technicians." He also argues that discrimination in the provision "of services and network elements is not practical because they are provided utilizing the facilities, switches, and

---

[28] Affidavit of William C. Deere on behalf of Southwestern Bell Telephone Company, dated April 8, 1997 ("Deere Affidavit").

[29] Deere Affidavit, at 34, para. 119.

systems that were specifically designed to automatically provide nondiscriminatory service."[30] Mr. Deere points out that all types of traffic (such as local, intraLATA toll, and interLATA toll) arrive on SWBT's local network in random order, are carried on trunks and loops intermingled with traffic from many carriers, and users are switched by local and tandem switches pursuant to standard software and routing tables. He then goes on to conclude that "large scale discrimination . . . is not feasible to implement and would be easily detectable in any event."[31] I strongly disagree with portions of Mr. Deere's analysis and conclusions.

One area with which I strongly disagree is Mr. Deere's conclusions regarding the plausibility of SWBT discriminating by modifying the software that drives the end office and tandem office switches employed in their local network. Mr. Deere argues that SWBT's "computer controlled switches are designed to operate under stored program control utilizing software provided by switch manufacturers."[32] He goes on to state that "These software routines are designed by the manufacturer to handle all traffic in a similar manner and to provide all comparable features and capabilities of the switch on a generic basis."[33] He then concludes that any attempt by SWBT to modify this software would violate the manufacturer's warranty and could jeopardize overall network reliability.

Mr. Deere conveniently ignores the fact that one of most compelling motivations for separating the service logic from lower level switching functions (i.e., the intelligent network

---

[30] Deere Affidavit, at 34, para. 121.

[31] Deere Affidavit, at 36, para. 127.

[32] Deere Affidavit, at 37, para. 130.

[33] Deere Affidavit, at 37-38, para. 130.